

*1-4 Determine whether the lines are parallel, perpendicular, or neither.

1) $y = 3x + 5$ $m = 3$
 $y = -3x - 8$ $m = -3$
 NEITHER

2) $y = \frac{1}{2}x + 1$ $m = \frac{1}{2}$
 $y = -2x + 8$ $m = -2$ PERPENDICULAR

3) $y = -8x + 11$ $m = -8$
 $y = -8x - 2$ $m = -8$
 PARALLEL

4) $x + y = 12$ $y = -x + 12$ $m = -1$
 $y = x + 8$ $y = x + 8$ $m = 1$
 PERPENDICULAR

5) $3x + y = 11$ $y = -3x + 11$ $m = -3$
 $y = -3x - 5$ $y = -3x - 5$ $m = -3$
 PARALLEL

6) $4x + 2y = 8$
 $y = -2x - 2$ $m = -2$
 $4x + 2y = 8$
 $-4x$ $-4x$
 $\frac{2y}{2} = \frac{-4x + 8}{2}$
 $y = -2x + 4$ $m = -2$
 PARALLEL

#7-10 Determine whether the lines through the given sets of points are parallel, perpendicular, or neither

7) $(2, -3)$ $(-3, 7)$ and $(1, 1)$ $(7, 4)$

8) $(-1, -3)$ $(-8, -9)$ and $(6, -4)$ $(1, -2)$

$(2, -3)$
 $(-3, 7)$
 $\frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - (-3)}{-3 - 2} = \frac{10}{-5} = -2$
 $m = -2$

$(1, 1)$
 $(7, 4)$
 $\frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 1}{7 - 1} = \frac{3}{6} = \frac{1}{2}$
 $m = \frac{1}{2}$

PERPENDICULAR

$(-1, -3)$
 $(-8, -9)$
 $\frac{y_2 - y_1}{x_2 - x_1} = \frac{-9 - (-3)}{-8 - (-1)} = \frac{-6}{-7} = \frac{6}{7}$
 $m = \frac{6}{7}$

$(6, -4)$
 $(1, -2)$
 $\frac{y_2 - y_1}{x_2 - x_1} = \frac{-2 - (-4)}{1 - 6} = \frac{2}{-5} = -\frac{2}{5}$
 $m = -\frac{2}{5}$

NEITHER

9) $(2,4)(4,8)$ and $(1,0)(3,4)$

$$\begin{array}{r} (2,4) \\ - (4,8) \\ \hline -2 \quad -4 \\ \hookrightarrow -2 = \frac{4}{2} \end{array} \quad \begin{array}{r} (1,0) \\ - (3,4) \\ \hline -2 \quad -4 \\ \hookrightarrow -2 = \frac{4}{2} \end{array}$$

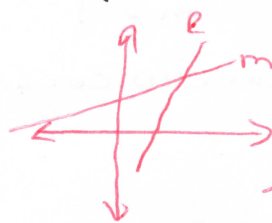
$m=2$ $m=2$
PARALLEL

10) $(0,-5)(3,4)$ and $(2,4)(1,-2)$

$$\begin{array}{r} (0,-5) \\ - (3,4) \\ \hline -3 \quad -9 \\ \hookrightarrow -3 = \frac{9}{3} \end{array} \quad \begin{array}{r} (2,4) \\ - (1,-2) \\ \hline 1 \quad 6 \\ \hookrightarrow 1 = \frac{6}{6} \end{array}$$

$m=3$ $m=6$
NEITHER

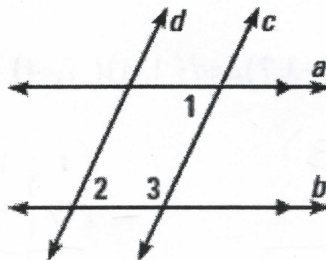
- 11) Explain what it means to have two lines that are neither parallel or perpendicular.
(hint: draw a picture to help you out) 3-4 sentences.

 If you have 2 lines that are neither parallel or perpendicular, you have 2 lines that either intersect to form an angle that is not 90° or they are skew lines that don't intersect. If the lines are coplanar, the slope determines what situation we have.

- 12) Mike has \$228 in his bank account and is saving \$35 per week, modeled by the equation $y = 35x + 228$. Joe is saving \$35 per week and has \$483 in his bank account, modeled by the equation $y = 35x + 483$. Will Mike ever have more money in his bank account than Joe, providing they never take money out? Explain your answer using mathematical reasoning.

No. They are both saving \$35 per week. If we graph both equations, we find they are parallel lines (slope=35). Since the lines are parallel, Mike will never catch up to Joe.

- 13) Given that $a \parallel b$, $\angle 1 \cong \angle 2$, Explain in complete sentences why $c \parallel d$.



$\angle 1 + \angle 3 = 180^\circ$ because they are consecutive interior angles of parallel lines ($a \parallel b$). Since $\angle 1$ and $\angle 2$ are congruent (given), $\angle 2 + \angle 3 = 180^\circ$ also. Since $\angle 2 + \angle 3 = 180^\circ$ we can conclude that $d \parallel c$ because consecutive interior angles are supplementary.